

WHAT IS CLAIMED IS:

1. A method for reconstructing an image of an object, said method comprising:

scanning an object using a computed tomographic (CT) imaging apparatus to acquire projections of the object;

determining a set of thresholds utilizing said projections;

associating selected smoothing kernels with said thresholds;

utilizing said smoothing kernels and said projections to produce smoothed projections in accordance with said thresholds; and

filtering and backprojecting the smoothed projections to generate an image of the object.

2. A method in accordance with Claim 1 wherein said determining a set of thresholds comprises determining a set of four thresholds comprising a high threshold, a medium threshold, a low threshold, and a very low threshold, and wherein a smoothing kernel is associated with each said threshold.

3. A method in accordance with Claim 2 wherein a one-to-one correspondence exists between said smoothing kernels and said thresholds.

4. A method in accordance with Claim 1 further comprising performing 3D smoothing conditioned upon a triggering of a threshold.

5. A method in accordance with Claim 1 wherein said utilizing smoothing kernels and said projections to produce smoothed projections comprises utilizing a smoothing gain factor to modulate smoothing of said smoothed projections.

6. A method in accordance with Claim 5 wherein said smoothing gain factor is a function of said projections.

7. A method for reconstructing an image of an object, said method comprising:

scanning an object using a computed tomographic (CT) imaging apparatus to acquire projections of the object;

producing temporary values utilizing the acquired projections, said producing temporary values including the production of prepped projections to a point prior to a logarithmic operation;

determining shading reduction (SR) factors as a function of the temporary values;

conditionally multiplying the prepped projections using the SR factors;

smoothing the prepped projections in accordance with pre-selected thresholds;

determining final projections utilizing unsmoothed prepped projections and smoothed prepped projections; and

filtering and backprojecting the final projections to generate an image of the object.

8. A method in accordance with Claim 7 wherein said producing temporary values further comprises multiplying said prepped projection values by a constant.

9. A method in accordance with Claim 7 further comprising clipping said SR factors to avoid logarithmic singularities.

10. A method in accordance with Claim 7 wherein said smoothing the prepped projections in accordance with pre-selected thresholds comprises using different degrees of smoothing depending upon which of the pre-selected thresholds are triggered.

11. A method in accordance with Claim 7 wherein said smoothing comprises 3D smoothing.

12. A method in accordance with Claim 7 wherein said smoothing is directional.

13. A method in accordance with Claim 7 wherein said smoothing is adaptive.

14. A method in accordance with Claim 7 further comprising determining smoothing gain factors in accordance with a relative strength of the smoothed prepped projections.

15. A CT imaging apparatus configured to:

scan an object to acquire projections of the object;

determine a set of thresholds utilizing said projections;

associate selected smoothing kernels with said thresholds;

utilize said smoothing kernels and said projections to produce smoothed projections in accordance with said thresholds; and

filter and backproject the smoothed projections to generate an image of the object.

16. An apparatus in accordance with Claim 15 wherein to determine a set of thresholds, said apparatus is configured to determine a set of four thresholds comprising a high threshold, a medium threshold, a low threshold, and a very low threshold, and to associate a smoothing kernel with each said threshold.

17. An apparatus in accordance with Claim 16 wherein said smoothing kernels and said thresholds exist in one-to-one correspondence.

18. An apparatus in accordance with Claim 15 further configured to perform 3D smoothing conditioned upon a triggering of a threshold.

19. An apparatus in accordance with Claim 15 wherein to utilize smoothing kernels and said projections to produce smoothed projections, said apparatus is configured to utilize a smoothing gain factor to modulate smoothing of said smoothed projections.

20. An apparatus in accordance with Claim 19 wherein said smoothing gain factor is a function of said projections.

21. A CT imaging apparatus configured to:

scan an object to acquire projections of the object;

produce temporary values utilizing the acquired projections, wherein said production of temporary values includes the production of prepped projections to a point prior to a logarithmic operation;

determine shading reduction (SR) factors as a function of the temporary values;

conditionally multiply the prepped projections using the SR factors;

smooth the prepped projections in accordance with pre-selected thresholds;

determine final projections utilizing unsmoothed prepped projections and smoothed prepped projections; and

filter and backproject the final projections to generate an image of the object.

22. An apparatus in accordance with Claim 21 wherein to produce temporary values, said apparatus is further configured to multiply said prepped projection values by a constant.

23. An apparatus in accordance with Claim 21 further configured to clip said SR factors to avoid logarithmic singularities.

24. An apparatus in accordance with Claim 21 wherein to smooth the prepped projections in accordance with pre-selected thresholds, said apparatus is configured to use different degrees of smoothing depending upon which of the pre-selected thresholds are triggered.

25. An apparatus in accordance with Claim 21 wherein said smoothing comprises 3D smoothing.

26. An apparatus in accordance with Claim 21 wherein said smoothing is directional.

27. An apparatus in accordance with Claim 21 wherein said smoothing is adaptive.

28. An apparatus in accordance with Claim 21 further configured to determine smoothing gain factors in accordance with a relative strength of the smoothed prepped projections.

29. A computer-readable medium having instructions thereon configured to instruct a computer to:

determine a set of thresholds utilizing projections obtained by scanning an object;

associate selected smoothing kernels with said thresholds;

utilize smoothing kernels and said projections to produce smoothed projections in accordance with said thresholds; and

filter and backproject the smoothed projections to generate an image of the object.

30. A computer-readable medium in accordance with Claim 29 wherein to determine a set of thresholds, said computer-readable medium is configured to instruct the computer to determine a set of four thresholds comprising a high threshold, a medium threshold, a low threshold, and a very low threshold, and to associate a smoothing kernel with each said threshold.

31. A computer-readable medium in accordance with Claim 30 wherein said smoothing kernels and said thresholds exist in one-to-one correspondence.

32. A computer-readable medium in accordance with Claim 29 further configured to instruct the computer to perform 3D smoothing conditioned upon a triggering of a threshold.

33. A computer-readable medium in accordance with Claim 29 wherein to utilize smoothing kernels and said projections to produce smoothed projections, said machine-readable medium is configured to instruct the computer to utilize a smoothing gain factor to modulate smoothing of said smoothed projections.

34. A computer-readable medium in accordance with Claim 33 wherein said smoothing gain factor is a function of said projections.

35. A computer-readable medium having instructions thereon configured to instruct a computer to:

produce temporary values utilizing projections acquired from a scan of an object, wherein said production of temporary values includes the production of prepped projections to a point prior to a logarithmic operation;

determine shading reduction (SR) factors as a function of the temporary values;

conditionally multiply the prepped projections using the SR factors;

smooth the prepped projections in accordance with pre-selected thresholds;

determine final projections utilizing unsmoothed prepped projections and smoothed prepped projections; and

filter and backproject the final projections to generate an image of the object.

36. A computer-readable medium in accordance with Claim 35 wherein to produce temporary values, said computer readable medium is further configured to instruct the computer to multiply said prepped projection values by a constant.

37. A computer-readable medium in accordance with Claim 35 further configured to instruct the computer to clip said SR factors to avoid logarithmic singularities.

38. A computer-readable medium in accordance with Claim 35 wherein to smooth the prepped projections in accordance with pre-selected thresholds, said computer-readable medium is configured to instruct the computer to use different degrees of smoothing depending upon which of the pre-selected thresholds are triggered.

39. A computer-readable medium in accordance with Claim 35 wherein said smoothing comprises 3D smoothing.

40. A computer-readable medium in accordance with Claim 35 wherein said smoothing is directional.

41. A computer-readable medium in accordance with Claim 35 wherein said smoothing is adaptive.

42. A computer-readable medium in accordance with Claim 35 further configured to instruct the computer to determine smoothing gain factors in accordance with a relative strength of the smoothed prepped projections.